That which is claimed is:

- A crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling said hydrocarbon feedstock in at least one refrigerated crystallization stage that is indirectly refrigerated by evaporating at least a portion of a substantially liquid stream comprising ammonia.
- 2. The process of Claim 1 wherein said substantially hydrocarbon feedstock comprises hydrocarbons consisting essentially of ethylbenzene, paraxylene, metaxylene, orthoxylene, and hydrocarbon impurities.
- 3. The process of Claim 1 wherein said substantially hydrocarbon feedstock comprises a low paraxylene concentration of less than about 50 weight percent paraxylene.
- 4. The process of Claim 1 wherein said substantially hydrocarbon feedstock comprises a low paraxylene concentration of less than about 30 weight percent paraxylene.

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 The process of Claim 1 wherein said substantially hydrocarbon feedstock comprises a high paraxylene concentration of at least about 50 weight percent paraxylene.

- The process of Claim 1 wherein said substantially hydrocarbon feedstock comprises a high paraxylene concentration of at least about 70 weight percent paraxylene.
- 7. The process of Claim 1 wherein at least one crystallization stage is cooled by heat exchange with an ethylene refrigerant, wherein said ethylene refrigerant has been cooled with a stream comprising ammonia.
 - 8. The process of Claim 1 wherein said at least one crystallization stage removes from said hydrocarbon feedstock a stream of at least 70 weight percent paraxylene, further wherein said process produces a final, paraxylene product.
 - 9. The process of Claim 1 wherein said at least one crystallization stage is refrigerated by:
 - a. evaporating at least a portion of said substantially liquid stream comprising ammonia from enthalpy supplied by a heat source from said crystallization process, and
 - b. absorbing said evaporated ammonia from step (a) into a stream comprising a mixture enriched in water relative to ammonia.
 - 10. The process of Claim 1 wherein said indirect refrigeration comprises vaporizing a substantially liquid stream comprising ammonia by transfer of heat from said substantially hydrocarbon feedstock to said substantially liquid stream comprising ammonia.

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- 11. The process of Claim 10 wherein said indirect refrigeration further comprises said substantially liquid stream comprising ammonia not in direct contact with said substantially hydrocarbon feedstock.
- 12. The process of Claim 10 wherein said indirect refrigeration further comprises said substantially liquid stream comprising ammonia and said substantially hydrocarbon feedstock located on opposite sides of a heat transfer surface.
 - 13.A crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling said hydrocarbon feedstock in at least one crystallization stage cooled by an ethylene refrigerant, wherein said ethylene refrigerant has been cooled by heat exchange with a substantially liquid stream comprising ammonia.

- 14. The process of Claim 13 wherein said substantially hydrocarbon feedstock comprises hydrocarbons consisting essentially of ethylbenzene, paraxylene, metaxylene, orthoxylene, and hydrocarbon impurities.
- 15. The process of Claim 13 wherein said substantially hydrocarbon feedstock comprises a paraxylene concentration of less than about 50 weight percent paraxylene.

- 16. The process of Claim 13 wherein said substantially hydrocarbon feedstock comprises a paraxylene concentration of less than about 30 weight percent paraxylene.
- 17. The process of Claim 13 wherein said at least one crystallization stage removes from said hydrocarbon feedstock a stream of at least 70 weight percent paraxylene.
- 18. The process of Claim 17 wherein said stream is slurried at least once and melted to produce a final paraxylene product.
 - 19. A crystallization process for recovering paraxylene from a substantially hydrocarbon feedstock comprising cooling said hydrocarbon feedstock in at least one refrigerated crystallization stage that is indirectly refrigerated by cooling substeps comprising:
 - a. contacting a stream comprising ammonia vapor with a stream comprising water and forming a liquid mixture comprising water and ammonia,
 - recovering from said liquid mixture comprising water and ammonia a substantially liquid stream comprising ammonia, and
 - c. vaporizing at least a portion of said substantially liquid stream comprising ammonia by transferring at least a portion of the enthalpy of vaporization to said substantially liquid stream comprising ammonia from said hydrocarbon feedstock.

- 20. The process of Claim 19 wherein said liquid mixture comprising water and ammonia of step (a) is further recovered as a stream enriched in ammonia relative to water.
- 21. The process of Claim 20 wherein said stream enriched in ammonia relative to water is directed for fractionation into said substantially liquid stream comprising ammonia and a stream enriched in water relative to ammonia.
 - 22. An ammonia absorption refrigeration process comprising at least one enthalpy source selected from the group consisting of: condensing overhead vapors of distillation towers used to separate products, byproducts, and/or recycle streams of a crystallization process to recover paraxylene; reactor effluent streams of a crystallization process to recover paraxylene; furnace flue gas of a crystallization process to recover paraxylene; steam generated during a crystallization process to recover paraxylene; and warm streams on other chemical or refinery process units located near a paraxylene crystallization process unit.
 - 23. The process of Claim 22 wherein said enthalpy source is provided at a temperature of at least about 200° F.
 - 24. The process of Claim 22 wherein said enthalpy source is provided at a temperature of at least about 250° F.

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